Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Original) A method of making a tantalum structure, comprising creating a tantalum layer disposed on a first layer region of a first layer and on a second layer region of a second layer, wherein said tantalum layer is a substantially bcc-phase tantalum region on said first layer region and said tantalum layer is a non-bcc-phase tantalum region on said second layer region.

2. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises:

creating said substantially bcc-phase tantalum region having a compressive residual stress; and

creating said non-bcc-phase tantalum region having a compressive residual stress.

3. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises creating said substantially bcc-phase tantalum region in contact with said non-bcc-phase tantalum region.

4. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises creating said tantalum layer wherein said substantially bcc-phase tantalum region and said non-bcc-phase tantalum region are contiguous and form a continuous tantalum film.

5. (Previously presented) The method in accordance with claim 1, further comprising:

forming said first layer region over a substrate; and

forming said second layer region over said substrate.

6. (Previously presented) The method in accordance with claim 5, wherein forming said first layer region comprises forming a bcc-phase-tantalum forming region disposed over or on said second layer.

7. (Original) An apparatus manufactured in accordance with claim 6.

8. (Original) The method in accordance with claim 1, further comprising creating said first layer.

9. (Previously presented) The method in accordance with claim 8, wherein creating said first layer comprises creating a bcc-phase-tantalum forming first layer as said first layer.

10. (Previously presented) The method in accordance with claim 9, wherein creating said bcc-phase-tantalum forming first layer comprises sputter depositing or chemically vapor depositing, or both, said bcc-phase-tantalum forming first layer.

11. (Previously presented) The method in accordance with claim 9, wherein creating said bcc-phase-tantalum forming first layer comprises creating said bcc-phase-tantalum forming first layer utilizing a material selected from the group consisting of niobium, aluminum, titanium, tantalum nitride, aluminum nitride, niobium nitride, titanium nitride, and mixtures thereof.

12. (Previously presented) The method in accordance with claim 9, wherein creating said bcc-phase-tantalum forming first layer comprises creating said bcc-phase-tantalum forming first layer disposed on a sacrificial layer.

13. (Original) The method in accordance with claim 12, further comprising:

removing said sacrificial layer; and

forming a free standing tantalum film having bcc-phase tantalum regions and non-bcc-phase tantalum regions.

14. (Previously presented) The method in accordance with claim 9, wherein creating said bcc-phase-tantalum forming first layer comprises creating a monolayer bcc-phase-tantalum forming first layer as said bcc-phase-tantalum forming first layer.

15. (Previously presented) The method in accordance with claim 9, wherein creating said bcc-phase-tantalum forming first layer comprises depositing said bcc-phase-tantalum forming first layer utilizing a deposition technique selected from the group consisting of sputtering, laser ablation, electron beam evaporation, thermal evaporation, electro-deposition, electroless deposition, chemical vapor deposition, and combinations thereof.

16. (Previously presented) The method in accordance with claim 8, wherein creating said first layer comprises creating a bcc-phase-tantalum forming substrate, wherein said second layer is disposed over said bcc-phase-tantalum forming substrate.

17. (Original) The method in accordance with claim 16, further comprising depositing said second layer over said bcc-phase-tantalum forming substrate.

18. (Original) The method in accordance with claim 17, further comprising:
patterning said second layer; and
forming openings in said second layer exposing regions of said bcc-phase-tantalum forming substrate.

19. (Original) The method in accordance with claim 1, further comprising creating said second layer, wherein said second layer is a substrate.

20. (Original) The method in accordance with claim 19, further comprising creating said first layer over said substrate.

21. (Original) The method in accordance with claim 1, further comprising etching said tantalum layer.

22. (Previously presented) The method in accordance with claim 22, wherein etching said tantalum layer comprises selectively etching said non-bcc-phase tantalum region.

23. (Previously presented) The method in accordance with claim 22, wherein selectively etching said non-bcc-phase tantalum region comprises selectively etching said non-bcc-phase tantalum region without a mask.

24. (Original) The method in accordance with claim 21, further comprising etching said tantalum layer utilizing a chlorine reactive ion plasma etch to selectively etch said non-bcc-phase tantalum region.

25. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises applying a voltage bias to said first layer.

26. (Original) The method in accordance with claim 25, wherein applying said voltage bias comprises applying a voltage bias less than about 550 volts.

27. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises creating said tantalum layer wherein said substantially bcc-phase tantalum region has a resistivity of about 13 micro-ohm centimeters, and wherein said non-bcc-phase tantalum region has a resistivity of about 220 micro-ohm centimeters.

28. (Previously presented) The method in accordance with claim 1, wherein creating said tantalum layer comprises creating said tantalum layer wherein said substantially bcc-phase tantalum region and said non-bcc-phase tantalum region each has a resistivity and said resistivity of said substantially bcc-phase tantalum region is about 10 times less than said resistivity of said non-bcc-phase tantalum region.

29. (Original) The method in accordance with claim 1, further comprising cleaning said first layer region before creating said tantalum layer.

30. (Previously presented) The method in accordance with claim 29, wherein cleaning said first layer region comprises wet chemically cleaning said first layer region.

31. (Previously presented) The method in accordance with claim 29, wherein cleaning said first layer region comprises sputter pre-cleaning said first layer region.

32. (Previously presented) The method in accordance with claim 31, wherein sputter pre-cleaning comprises sputter cleaning said first layer region utilizing an inert gas.

33. (Previously presented) The method in accordance with claim 32, wherein sputter pre-cleaning comprises sputter cleaning said first layer region utilizing a halogen gas.

34. (Original) The method in accordance with claim 1, further comprising creating said second layer.

35. (Previously presented) The method in accordance with claim 34, wherein creating said second layer comprises creating a dielectric layer disposed between a substrate and said first layer.

36. (Previously presented) The method in accordance with claim 35, wherein creating said dielectric layer comprises:

creating a silicon carbide layer disposed between said substrate and said first layer; and

creating a silicon nitride layer disposed between said substrate and said silicon carbide layer.

37. (Original) The method in accordance with claim 1, further comprising creating a resistor layer disposed between a substrate and said first layer.

38. (Previously presented) The method in accordance with claim 37, wherein creating said resistor layer comprises creating said resistor layer having a material selected from the group consisting of tantalum aluminum alloys, polycrystalline silicon, tungsten silicon nitride, and mixtures thereof.

39. (Original) The method in accordance with claim 37, further comprising creating an electrical conductor electrically coupled to said resistor layer.

40. (Original) The method in accordance with claim 1, further comprising creating a chamber layer disposed over said tantalum layer.

41. (Original) The method in accordance with claim 40, further comprising forming a fluid ejection chamber in said chamber layer.

42. (Original) The method in accordance with claim 40, further comprising creating a nozzle layer disposed over said chamber layer.

43. (Original) The method in accordance with claim 42, further comprising forming at least one nozzle in fluid communication with a fluid ejection chamber formed in said chamber layer.

44. (Original) An apparatus manufactured in accordance with claim 1.

45. (Original) A fluid ejector head manufactured in accordance with claim 1.

46. (Original) The method in accordance with claim 1, further comprising:

creating said first layer wherein said first layer is a bcc-phase-tantalum forming substrate; and

depositing a non-bcc-phase-tantalum forming layer on said bcc-phase-tantalum forming substrate.

47. (Original) The method in accordance with claim 46, further comprising:

patterning said non-bcc-phase-tantalum forming layer; and

creating openings to said bcc-phase-tantalum forming substrate.

48. (Original) The method in accordance with claim 46, wherein said bcc-phase-tantalum forming substrate includes a material selected from the group consisting of niobium, aluminum, titanium, tantalum nitride, aluminum nitride, niobium nitride, titanium nitride, and mixtures thereof.

49. (Previously presented) An apparatus, comprising a tantalum layer having therein a substantially bcc-phase tantalum region contiguous to a non-bcc-phase tantalum region, wherein said substantially bcc-phase tantalum region and said non-bcc-phase tantalum region each have a compressive residual stress.

50. (Previously presented) An apparatus, comprising:

a substrate;

a tantalum layer disposed over said substrate; and

a bcc-phase-tantalum forming seed region disposed between said substrate and said tantalum layer, said bcc-phase-tantalum forming seed region in contact with said tantalum layer, wherein said tantalum layer forms a substantially bcc-phase tantalum region where said tantalum layer is in contact with said bcc-phase-tantalum forming seed region, and wherein said tantalum layer forms a non-bcc-phase tantalum region where said tantalum layer is not in contact with said bcc-phase tantalum forming seed region.

51. (Previously presented) The apparatus in accordance with claim 50, wherein said substantially bcc-phase tantalum region and said non-bcc-phase tantalum region are both under a compressive residual stress layer where said tantalum layer is not in contact with said bcc-phase-tantalum forming region.

52. (Previously presented) The apparatus in accordance with claim 51, further comprising:

a silicon oxide layer disposed on said substrate;

a resistive layer disposed on said silicon oxide layer; and

a first dielectric layer disposed over said resistive layer, said bcc-phase-tantalum forming seed region disposed on a portion of said first dielectric layer, said tantalum layer disposed on said dielectric layer and on said bcc-phase-tantalum forming seed region, wherein said non-bcc-phase tantalum layer is formed on said dielectric layer and said substantially bcc-phase tantalum layer is formed on said bcc-phase-tantalum forming seed region.

53. (Previously presented) The apparatus in accordance with claim 50, further comprising:

a chamber layer disposed over said tantalum layer, said chamber layer having at least a portion of a chamber formed therein; and

a nozzle layer disposed over said chamber layer, said nozzle layer having at least one nozzle formed therein and in fluid communication with said chamber.

54-56. (Cancelled)

57. (Previously presented) An apparatus, comprising:

a substrate; and

means for generating a difference in thermal conductivity laterally within an essentially uniformly thick tantalum layer disposed over said substrate.

58. (Currently amended) The apparatus in accordance with claim 57, further comprising means for heating a fluid, said means for heating a fluid disposed between said tantalum layer and said substrate.

59. (Previously presented) The apparatus in accordance with claim 57, further comprising means for electrically isolating said means for heating.

60. (Currently amended) The apparatus in accordance with claim 57, wherein said means for generating a difference in thermal conductivity laterally within an essentially uniformly thick tantalum layer ~~further comprising~~ includes means for generating a difference in electrical conductivity laterally within an essentially uniformly thick tantalum layer disposed over said substrate.

61. (Previously presented) The apparatus in accordance with claim 57 wherein said essentially uniformly thick tantalum layer has an essentially uniform composition.